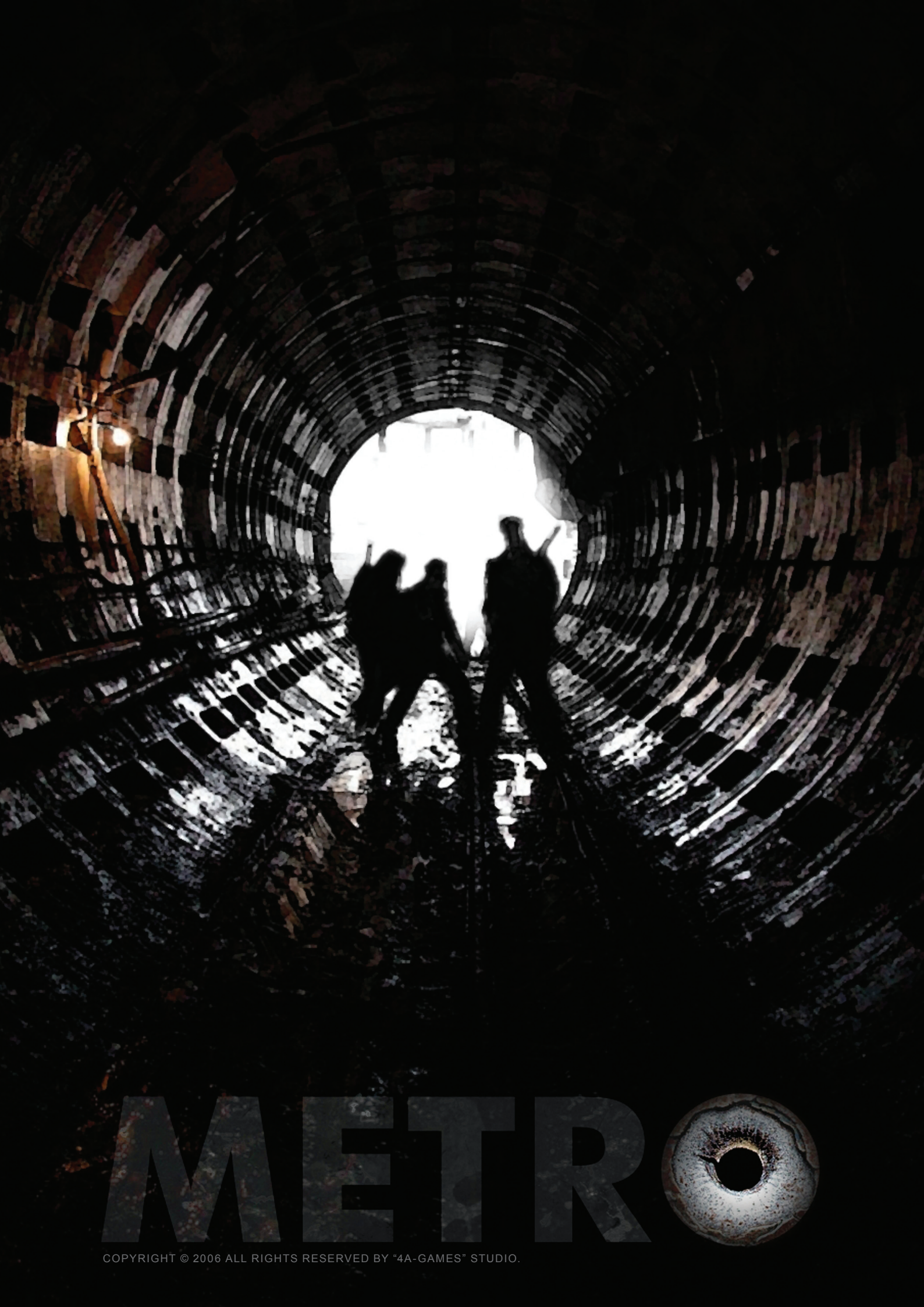


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# METRO:  Nightmare's World

(Working Title)

*Lead*: PC, Xbox 2

*Creative Director*: Andrew Prokhorov

## Document Purpose

This document serves to describe/visualize as a first approximation a new Game project as a potential base for a new agreement between 4A-Games and a potential publishing partner. All materials shown here are copyright to 4A-Games. All content is highly confidential and underlies the mutual confidential agreement previously signed.

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# Game Outline

| | |
|---|---|
| **Genre/ Platform** | 3D Action-oriented horror/action/survival FPS with elements of RPG for Hi-End PC and X-Box-360. |
| **Basic Idea** | All design and production solutions in the product support the following goals: develop a mass-market, story-driven FPS designed around horror/action/survival and create a game world of mankind threatening environment. Using the proprietary 4A Engine, 4A Games will create visual brilliance on Hi-End PC (X-Box-360), with unsurpassed movie-quality graphics, realistic game physics, non-scripted AI, RPG elements and strong replay ability, reasonable combination of full gameplay freedom and fast intense action. Combination of in-door and out-door environment. Multiplayer, both split-screen and online, will be another key gameplay feature. |
| **Audience** | Key target: 12-40 year-old gamers. The game will be focused on casual gamers but with strong replayability, tactical depths and skill-based action to satisfy hardcore gamers. |
| **Location/ Setting / Plot-Synopsis** | Year 2040. Horrible Post-Apocalyptic world of 40000 people. They have been living in metro of a big ex-USSR city (Moscow, Kiev) for 20 terrible years. It doesn't matter why the disaster happens: nuclear war, disappearance of ozone layer, space attack or other disasters, science experiments etc. These people are the last representatives of mankind - human cycle of evolution nears its end, new species (very ugly) appear on the surface of the Earth and deep inside of metro. Some people inside the metro still remember happy years before THAT DAY and they still believe that one day they will return up to the surface. What's present is a very heavy psychological atmosphere: small children who will never see sky, old people who still remember the PAST times, and young men and women who fight for their world, for their children. Each station became a country, with its government, army, borders and many other things from the past. Firearms cartridges serve as currency. This small dying world is a precise copy of the past big world. Do these humans have future or we are doomed for extinction? Maybe answers can be found on the surface, or in deep secret military underground laboratories. Who knows? |
| **Gameplay** | Horror atmosphere, surviving action gameplay which gives each player the possibility to choose his/her own style and way of game play-through. Story-based game experience of at least 20 hours in single-player. |
| **Camera** | The gameplay supports 2 different camera modes. When running/moving around, the player can move using the movement stick and a free-roaming 3rd person camera. When shooting, the player can use an "aiming" button that moves the camera to 1st person immediately. Players can switch to either type of camera at any time for as long as they wish. |
| **Key Selling Points** | Dynamic movie-quality graphics-based gameplay. Innovative "Time of Non-Return" gameplay. Stamina/hunger/full day-night cycle" based gameplay. Elements of team shooter. Anomalies, mutants, trading, upgrading of equipment and weapons. Combination of fully realistic and fictional weapons and defensive tools. Innovative Shooting and Defensive Mechanics. Rational minimum of HUD elements. Simplicity in Controls. Strong Multiplayer Component. |
| **Multiplayer** | Multiplayer (up to 32 players) available with various arenas and modes in the multiplayer-only section. |
| **Data Statistics** | Though we cannot, of course, know the details at this point, some basic idea of the scope/scale of the game includes: 16 Single Player Models, each of them playable in multiplayer, 10 enemy mutant models. 12 Weapons. 5 Vehicles. Major Campaign Area - 15x15 sq.km. 16 Multiplayer arenas set in the story-campaign locations adjusted for MP gaming. |

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# Concept Description And Reasoning

The world cataclysm of the year 2010 brought deaths to a majority of the mankind. No need to tell exactly about what the cataclysm it was – ozone layer destruction after a crazy experiment, solar activity, a nuclear war, or something else. This or that way, but now you can not stay long on the surface without a protection suit to remain alive in the daytime, while gangs of "new race" mutants flooding the now free Earth would give you no chance to survive at nights. Only dwellers of major cities having deep subways could survive. These were, particularly, such former USSR cities as Kiev, Moscow, or Minsk, where the subways had been built as nuclear bomb shelters, 60 to 100 meters deep.

The game events are dated by the year 2040. In their 30-year history, the subway stations transformed into mini-states, each one having its own Army, Administration, some type of industry, etc. A generation was born and brought up underground. An average state station population is around 100 to 200 people. To survive, they cultivate mushrooms and breed pigs, support some industry manufacturing filter-and-vent units. Naturally, they make raids to surface to get fuel, ammunition, food, medicines, etc. The station states have various political systems, such as communist, capitalistic, fascist, clerical, anarchic, states of scientists, merchants, military states. Such a "specialization" originated from what every state had over them when the "Judgement Day" had come. Thus, the Scientist State has formed under the University, the Military State locates under the Ministry of Defense, and the Merchant State is under a large market place. The station states trade with one another, form alliances, launch wars – in fact, they do everything states did once in the Big World.

Every station's life in the game is to be shown as vividly as possible; every character will live its life: soldiers will be patrolling the tunnels, merchants traveling between stations in their hand-driven rail cars, workers fulfilling their routine duties at mushroom and pig farms, engineers looking after the filter-and-vent units, children playing beside fires, women cooking, old men narrating stories about their times and teaching children. All these enlivening details, put together, will make the gamer believe he/she really is a Defender of this world, not just a freelancer counting killed enemies. Besides, the characters would eat, sleep, you will be able (and ought) to communicate and trade with them, to get information and orders from them, etc.

The underground life, too hard and dangerous for a human being, gave rise to numerous new religions ranging from Christian theories about atonement for the Old World's sins to worshiping of The Great Worm who dug these excellent tunnels for people. A mystic component in the form of strange anomalies, "voices", entourage characters fits well into the Subway Idea framework adding some spice to the apocalyptic world.

With all its visible hopelessness and suppressive atmosphere to be shown as convincingly as possible in the game, the New World is struggling not just to survive but to keep all the humankind cultural heritage. The radiation level on the surface is lowering gradually, the ozone layer is restoring, and the scientists say it will be possible to come back to the surface in 20 to 25 years. A struggle for survival micro-episode

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is to be shown in the game, where the main character takes a mission to rescue his station from surface mutant hordes. Just one fight won by the mankind. The game development will make the gamer understand that there ought to be many such small victories for the mankind to win The Battle. And he/she will have the chance to participate in every one of them.

The idea of subway as a post-apocalyptic mankind shelter brings several essential advantages for us, the developers:

1. A subway can be represented schematically as a "meccano" put together using relatively simple elements. This allows us to reduce considerably the time required for level design, while using reference units simplifies the engine tasks. The time saved can be used for geometry and gameplay refinement.
2. Taking into account closed spaces, poor visibility, and a limited texture set in the underground part, we can add geometry and lighting per unit of area to make images as realistic as possible.
3. Ramified subway lines make it possible to organize controlled non-linearity for the game. Coming to a junction station, the gamer can choose his/her own way and, accordingly, his/her own way of the story development.
4. Since every station has an exit to the surface, it is easy to combine indoor and outdoor game plot lines.
5. Since all the big cities in the world have subways, we have no geographic limitations for add-ons and new game versions. We can choose Paris, London, Prague, etc.
6. The subway idea is new and so far not skidded over by developers. And the idea of underground station states is a know-how belonging to us and Mr. Dmitriy Gluhovskiy, the author of the Metro 2003 novel, we collaborate with.
7. The game idea fits well into MMO games, and after launching the pilot project, a large MMO Shooter can be started with. The idea is under development too.

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# Game World Description

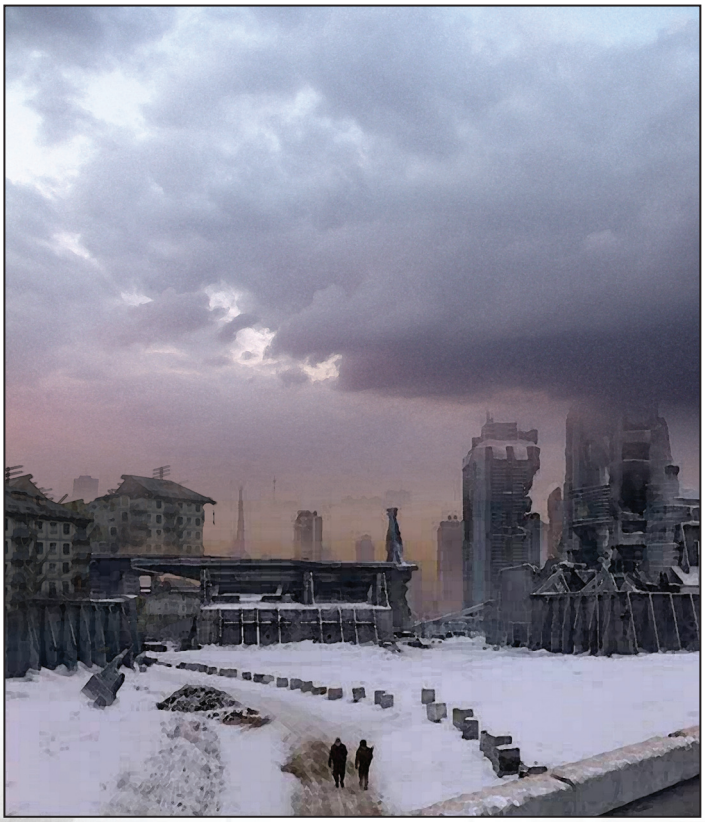
## Game World Design And Unique Geometry

At this stage, Moscow was chosen as the scene of action. It is a city of numerous world-known remarkable architectural objects. As for the underground entourage, the Moscow subway (Metropolitan) is one of the best. It is under protection of UNESCO, included in the list of modern wonders of the world, and attract numerous foreign tourists. Every Moscow Metropolitan station is unique in its architecture and design (http://www.metrowalks.ru/moscow), differing distinctly from other cities' subways. Note that the Gluhovskiy's book is about the Moscow subway, and this is one more argument in favor of our choice.

Geometrically, the Game World has the following three components: Dead City (surface), Subway, and Catacombs.

## Dead City

City areas have various levels of devastation. Shops, drugstores, warehouses, military and police arsenals that remained intact contain much things the underground dwellers need critically. Scouts of all stations make sallies to the surface times and again fighting with one another and with the new city dwellers, animal and human mutants. The surface is radioactive. Moreover, the sunlight enormously enforced by lack of the ozone layer brings death to every human being, and that is why the sallies are made at nights. As the game is to support a realistic time and climate cycle, a gamer must take time into account. Taking for granted that it is impossible to survive on the surface without some kind of protective outfit (air balloons, complex respiratory filters, etc.), we have one more component for the 3D action game. A gamer ought to understand that the farther he/she goes, the less is his/her chances to return not getting suffocated somewhere on his/her way back. This condition allows us to design in details only the city areas adjacent to subway stations while using actual city pictures for panoramic views. The result would be the feeling of whole city with no need for its detailed design which is very time and work consuming. At the same time, the air reserve barrier will not allow a gamer to explore "the edge of the world". The places to be prepared for… In the course of the game, the gamer will once and again go to the surface on a mission, having also missions to be completed at other stations. Examples of such additional missions are listed below:



- Delivering prime necessity things (foodstuffs, weapons, ammunition, books, fuel, medicines, etc.) to other stations on their requests.
- Exterminating dens of mutants terrorizing one or another station.
- Rescuing scouts in trouble.
- Escorting scientists.

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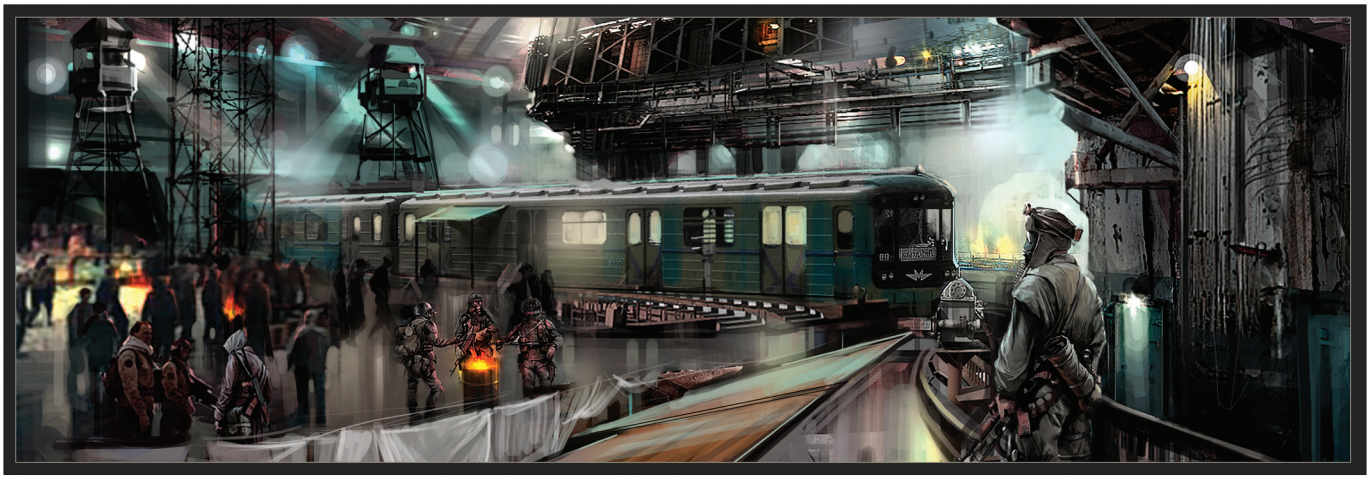
## Subway

This is the real city subway network, vast and branchy, with station States of various specificity. The subway is actually a place for the most part of the game plot to develop. This is where a gamer is supposed to spent about 60 % of the game time. In parallel to the plot development, the gamer will have the possibilities to participate in additional station-specific missions. These can be as follows: Guards for stations



having no protect barriers (hermolocks). A stationary machine-gun and a floodlight are the means to stop hordes of surface mutants running down the moving staircases to the underground "city". We will demonstrate what these "bad guys" can do if not stopped by the gamer in a clip showing the butchery they perpetrate over children, women, and old people he/she could not protect. This, supposedly, will make his/her commitment to win next time more strong.

- Covering engineers "reviving" some equipment with limited ammunition.
- Escorting merchant caravans in tunnels.
- Attacking hostile stations and capturing dominant tunnels.

## Catacombs

The catacombs include auxiliary subway tunnels and real ancient catacombs dug once under temples, fortresses, etc. They are inhabited by creatures even more monstrous than those on the surface. High radiation level resulted in mutations of underground animals and insects. Besides, there are various colonies of degraded wild or sectarian people in the catacombs.

A gamer can use the catacombs to get to the surface or to bypass blocked tunnels. Similarly to the first two components, this one will be used in both plot and additional mission parts, the latter including such missions as rescuing children captured by wild people, mopping-up mutants in the adjacent areas, etc.

The three game components provide some basic level of fascination and variety of impressions. Getting tired of dim tunnels and subway stations, a

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gamer can try to explore the surface, then descend underground again, this time to the catacombs. And every time he/she will have a choice in the plot development taking his/her own way both on the surface and underground. However, the process is controllable and bound to the main stations used in the plot.

## Social order of the world of Metro

Besides the availability of three "geometrically" unique levels, diversity of the game world is enhanced by special social system. The system is based on State-Stations and unions of several stations. Travel between states is governed by a system of passes with different access levels (single visit, multiple visits one station, unlimited visits to all stations of particular union). Such mechanism enables control of players within certain bounds set by plot or gameplay.

In the world of Metro, there are 14 states, however in the plot of the game only 7 will be used. Representatives of those states, except storyline characters, have one of the standard attitudes: friendly, neutral, hostile. This attitude is dependent on historically formed relationships between main character's home station and the state representative belongs to. Alteration of attitude during gameplay is not currently planned, as such implementation will lead to much longer process of gameplay balancing and testing. Attitude system will be supplemented by weapons control system, where the weapon is hidden on stations where no fight is planned and friend-foe identification does not allow shooting at friendly or neutral targets. On those stations where the fight is allowed a special scripted system will guide all unarmed NPCs (children, women, elderly) to special cover, where they cannot be hurt.

Below is a description of states and unions of the world of Metro, which are used in the plot of the game.

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## NEEE community (National Economy Efficiency Exhibition)

*General ideology*: Agricultural state

*Attitude towards main character*: native state of main character

*Description*: Agricultural society formed by main character's home station and adjacent stations. Engaged in growing special kind of mushrooms used in preparation of local "tea", which is sold throughout the metro.

## Ganza

*General ideology*: Market economy, capitalism model of America as in the middle of twentieth century.

*Attitude towards main character*: neutral

*Description*: "**The Union of Circle Line Stations**". Those stations, being located on intersections with all other branches, provide great meeting places for merchants from every corner of metro. They gained wealth extremely rapidly. Soon, when they realised their riches attract too much envy to be safe, they made a sole right decision. The union was created. Their official name was "The Union of Circle Line Stations", but people called them Ganza.

## Red Line

*General ideology*: Communism like Stalin times USSR.

*Attitude towards main character*: hostile

*Description*: Sokolniki line was always special. And the idea of resurrection of soviet state. One station officially returned to ideals of communism and socialism government type. Later several other stations did the same. Another station at another end of the tunnel had a revolution, and there it went. Survived veterans who formerly were komsomol figures, party members, lumpen-proletariat, all of them flowed to revolutionary stations. A committee was created that was responsible for expansion of new revolution and communism ideas to other stations of metro. It was named Interstational. Interstational was preparing squads of professional revolutionists and propagandists, sending them deep into enemy territories. Station names returned to old soviet names. Stations with neutral names were renamed into something more ideologically clear. Hundreds of inner security agents, old-fashioned named KGB, always closely watched happy inhabitants of Red Line, while their interest in foreign visitors truly boundless. Generally, no one could enter Red Line without special permission from "reds'" government. Constant passport checks, shadowing, and total suspicion immediately revealed both lost travellers and spies. All of them were treated as the latter, and their destiny was rather sad.

## Polis

*General ideology*: autocracy similar to the one in ancient Greece. Council consisting of wise men and military.

*Attitude towards main character*: neutral

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*Description*: Polis is governed by council. Most influential people are librarians and military. Bright electrical lighting is a trait of every Polis' station. There were telephony, cleanliness and other goods of civilization.

On the vast living territories there was final genuine centre of civilisation, final place where so many people lived, that provincials once being there never called this place anything but Polis. Only there you could meet people who kept the old and strange knowledge no more necessary in this new changed world.

## The Fourth Reich

*General ideology*: fascism

*Attitude towards main character*: hostile

*Description*: There was a huge barricade with two submachine gunners and one with a holster on his belt. All were dressed in camo and put on aslant black berets. On their arms white arm-bands were glowing – similar to german swastika, but with only three sides, not four. The walls around were covered in crosses, eagles, slogans and curses towards all non-Russian: "Metro – for russians!", "Non-russian – to the surface!", "Forward, to the final fight for the greatness of Russian nation!", "By fire and sword we set truly Russian order!", "Every man is a soldier, every woman – soldier's mother!". Fascists drove out all non-Russian from Pushkinskaya station, then Chehovskaya, Tverskaya… Their brutality rose, and by the end it turned into massacre.

## Organized crime

*General ideology*: Gangster America of twenties and Russian mafia of post-reform period in Soviet Union.

*Attitude towards main character*: neutrally hostile

*Description*: Within metro organized crime felt rather comfortable. Considering that there was no law-enforcement and weapons could be easily carried, bandits took control of several stations, specifically China-Town that was split among ethnic grouping of Russians and Caucasians, who had rather fragile peace treaty.

Closely trimmed hair, broad shoulders under heavily worn leather jackets, striped sports trousers worn as uniform. Everything looking quite funny did not actually dispose to a cheerful mood. There were three of them; the fourth stool was occupied by a deck of playing cards. They were throwing sixes, kings, queens and what a swearing there was…

On such stations sales of alcohol, drugs and weapons flourish being totally supported by inhabitants. From "above" they brought to metro their own concepts and methods of work.

## Revolutionists

*General ideology*: fighting for utopian ideas of equity and fellowship, and against any (in their opinion) injustice in metro.

*Attitude towards main character*: friendly

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*Description*: Communist Red Line stopped trying to build communism within all metro and started building it on a separate line. Apart from them there also were romantic-revolutionists (idea warriors), who continue their partisan warfare, trying to rouse the flame of revolution everywhere in metro and at the same time fighting fascists and exploiters of working-people. Red Line provides them with unadvertised support, supplying weapons, food, motorised rail cars and fuel. One of such brigades was called: "First International of Red Warfare Banner in the name of Comrade Ernesto Che Gevara Brigade of Moscow Metro". Composition was international, they call each other pronouncedly – comrade: "I'm comrade Rusakov. Here is comrade Bansai, - he pointed at Asian guy. There – comrade Maxim, - dark-skinned guy grinned again, - and here is comrade Fedor."

## Barbarians

*General ideology*: like primeval tribes on New Guinea

*Attitude towards main character*: hostile

*Description*: After blockage of Park of Victory, people contained there were degrading and becoming unsociable. They were painting images of the Great Worm along their routes and worshipped it. The head direction and length of the worm indicated which way and how far the nearest station is. They use blow guns with needles of two types – paralysing and poisonous. The speech is disjointed and primitive. General level of development – primeval tribes of New Guinea. They steal children to raise them in their own way. Adults are killed and eaten.

Several weird men stood around. They were almost naked, however it seemed they did not feel cold. A wavy line appeared on everyone's forehead. It was similar to the images found in tunnels. Their heads were shaved. Having moderate height, and rather unhealthy looks, they literally glowed with some superhuman power.

## To Make Stations More Lively

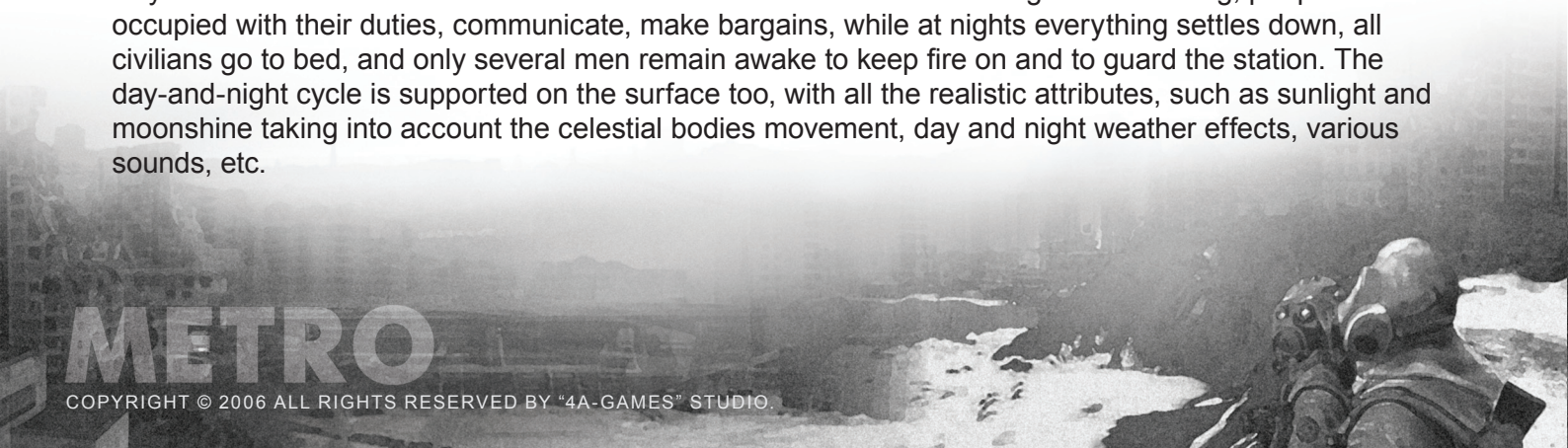
To male the picture more vivid, a script station enlivening system is being developed which will include:

### *Work for NPC at Stations*

Stations will be populated by both warriors and civilians living their lives in no dependence of a gamer. Children scampering between shacks and playing their games, adult men and women busy with their everyday duties (not taking into account functional military services, such as guards, patrols, etc.) are expected to create the sensation of a real post-nuclear world. While women are cooking, men are sitting around beside fires, cleaning their weapons, drinking tea or moonshine, reading books. Here and there you can see old men sitting beside tents. This is what makes the picture look real and impels the gamer to act not like a spectator but as one of those underground inhabitants.

### *Real Day-and-Night Cycle*

Daytime at a station lasts from 6 AM to 9 PM. This is the time when things are humming, people are occupied with their duties, communicate, make bargains, while at nights everything settles down, all civilians go to bed, and only several men remain awake to keep fire on and to guard the station. The day-and-night cycle is supported on the surface too, with all the realistic attributes, such as sunlight and moonshine taking into account the celestial bodies movement, day and night weather effects, various sounds, etc.

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### *Entourage Scenes and Conversations*

NPCs are sitting beside fires at stations yarning and narrating spicy stories and latest news, retelling old legends, discussing the underground world situation, singing. Times and again, an НПС can stand up, walk around, then come back to the fire again, get his food, have a snack, take a gulp from his flask, play a guitar. Such a set of non-scripted (universal) actions gives a gamer the impression of real life at the subway stations.

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# Game Process Description

## Brief Game Script

It was already said above that the game plot is based on the Metro 2033 book of Dmitriy Gluhovskiy, a modern author, published in 2005. Now the book plot is being adapted for the game in cooperation with the author.

In short, it is a story of one complex rescue mission where Artem, the main character, saves his home station, NEEE (National Economy Efficiency Exhibition). The station is attacked by the mutant hordes more and more every day. It is to become known later that an enormous mutant colony has settled over the station and is growing steadily like a cancer. The station governors decide to send Artem to Polis, the Capital, the heart of the underground world, one of the most powerful station States, to ask for help. Polis is a State of scientists and military men. Many an obstacle await Artem on his way – fascists, communists, savages, mutants, ghosts, as well as strange mystic dangers and anomalies – but he will manage to overcome all this thanks to friends' and allies' help as well as his own headpiece.

In the course of the game, plot assistants would appear in key places to "direct" the main character, then disappear to settle some their private affairs only to appear once again when their assistance is needed. Every of these assistants is to be personalized to have its own history and its own habits.

Having reached Polis, Artem is much disappointed with its governors who, being fully confident of their own safety, could offer nothing more than useless advices. But you can meet "good guys" everywhere, and these will be just such guys who will help him to organize several surface expeditions to find maps of the secret government subway line entries. Having penetrated there, they will find what had been the military command center once and maps of missile positions (or position remains) around Moscow. Several former military experts will manage to "revive" one of the tactical missile systems, and then the mutants settled over the Artem's station will get what they deserve. Artem will be responsible for missile guidance in the mission. He wins his battle, but the gamer is to realize that this is only a little episode in the long mankind's way to its survival.

We, the developers, would like to make the final plot corrections in cooperation with the publisher. Appendix 1 contains a fragment of the D. Gluhovskiy's novel to introduce the reader into the game world atmosphere. The fragment is to be used as an introduction to the game too.

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# Game Process Scheme

So, we have an interesting and mysterious post-apocalyptical world full of interesting characters, places, situations, and dangers. These are what we base our game on. We don't want to be trapped in rigid linearity of a shooter, but it is also our goal to avoid the hard to balance Stalker-like life simulation. We want the main game components to be shooter and controlled plot non-linearity, while RPG and вsurviving to be used as the additional ones.

## SHOOTER

This takes 50 % of the game time. An advanced AI, realistic physics of the game world and weapons, using light and shadows in fights, monsters climbing over walls, quick monster sub-spawn, and other features create much more bright picture of fire exchange and real fever of fight comparing with that of non-scripted AIs.

A fight is to be broken in three phases: fight preparation, the fight itself, and selecting the outfit.

***Fight Preparation*** is needed because when fighting, you have no time to take things out of your rucksack. When fighting, you can use quickly only things hanging on your belt, locating in your holster or in unloading system. Thus, the fight preparing phase becomes actually a fight planning phase. A gamer allocating things over a 3-D character model must guess in advance what he/she will need to win the next fight. For example, he/she may decide that what he/she need most is a shotgun with two packs of cartridges, while there is no need for grenades. Faulty weapon and ammunition selection can result in death.

***Fight Phase*** is a real fire exchange with an enemy using the weapons and ammunition that was allocated to the character model and are therefore accessible in the fight via hot keys. The AI features are detailed in the AI Capabilities section.

***Outfit selection***. In the Metro world, like in any other game, killed enemies are one of the main weapon and ammunition source. Such habits are especially important in the Metro world with its critically limited resources. When searching an enemy, we can see everything he has on his model and can take it. This means that if the enemy has a body armor, you can take it and put it on yourself. You can do the same with cartridge magazines, grenades, pocket flashes, etc.

## CONTROLLED PLOT NON-LINEARITY

We offer a linear plot development but with option selection when passing some specific point and with several (not exceeding three) options to pass locations. For example, when getting a mission:

- Artem, you must deliver these documents to the Library.

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- How much time have I got ?
- 2 days
- Understood. How ought I go? What about the Red Line? Is it penetratable?
- It can be passed but they may enjail you there or just kill. If only you have some friends there?
- Any other choices?
- You may go to Ganza, then across China Station. By the way, they have found a dry escape to the surface, near the Jail. You can get some munitions on your way. There is one more choice, straight across Glade. now abandoned. But some damn things occur there. People disappearing. I would not go.

Well, now the gamer can choose:

- Going across the Red Line (communists) where, according to the plot, he has an assistant. The game plot is controllable, and the situation is to develop according to our script, with shooting, chasing, etc.
- Choosing a longer but more safe way along the Ganza line (merchants) where it is possible to complete an additional mission.
- Taking a risk to go straight through unknown and dangerous places.

In some cases, the choice can be stipulated by past events. For example, a character whom the gamer helped once knows someone in the Red stations who takes bribes. Thus, it becomes possible for the gamer to choose deliberately what he/she wishes.

## RPG ITEMS

Only most necessary items ought to be taken:

**Trading**. In the underground world, cartridges are used as money. This condition adds spice to the game. A gamer will have to think well before shooting at everything that moves with his/her money! Now some balance is to be sought between shoot-everyone tactics and the economy mode where the aim is to be achieved with minimal resource expense. Having saved some "cash", the gamer can purchase more suitable equipment or just bribe local authorities. The station trade network resembles some peculiar pit stop system where the gamer can change his/her equipment as he/she wishes according to the game conditions becoming gradually more complex. Every merchant has a limited range of commodities, and cartridges are not always taken as payment means. Often, a purchaser has to do something for the merchant to pay. This may be delivering something from the surface or killing someone. Thus, commodity prices and merchants' individualities grow sharply, and this will affect the game process significantly. While one merchant requires an item to be paid with cartridges, another one can ask some good turn for it.

**Dialogues with an NPC** – where the gamer participates directly. Using face animations (eyes, mouth, emotions) and insonation makes an impression on the gamer. This is similar to HL2, but in our game, it is also possible to control conversations. Dialogues with an НПС can be subdivided into plot and additional ones. Plot dialogs help the gamer to move forward along the plotline. These are dialogs with plot NPCs, taking and reporting plot missions, etc. Additional dialogues support taking and reporting additional missions – particularly, those associated with trading.

**Character Weapon and Equipment Improvement**. Every change is mapped onto the 3D character model (see details in the HUD Item Description section). Every gamer can "improve" his/her own self if

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needed and according to the sum of money earned. Take AK-74 (Kalash), put on an army body armor and a cap, a helmet, or a gas-mask – everything is mapped visually on the model. A style of the game progress can be selected. A gamer preferring the kill-'em-dead style will probably choose a heavy armor with lots of weapons including a powerful machine-gun, and let somebody stops such a thug! But such a choice will make any character much slower, easy tiring, hardly able to jump or climb, to sneak somewhere unnoticed. A gamer preferring "quiet killing" will readily take a dark camouflage and rubber sole shoes for stealth, and also a sound-muffled (submachine) gun or some non-standard items like a crossbow or missile knives. Thus, you have a stealthy, invisible terminator. Likewise, we can get a variety of characters differing not just visually but in their characteristics.

The following character features depend on its outfit:

- Protection
- Moving speed
- Tiredness (how log can it sprint or jump)
- Noiselessness
- Invisibility

## SURVIVAL

**Non-Return Time**. This is a new gameplay element. After the nuclear war, when also chemical and biological weapons were applied, the Earth surface is under the high level of irradiation and aggressive chemical activity. Thus, it is impossible to stay there long having no special equipment (a protection suit, a gas-mask, etc.) The time a character can stay on the surface depends on the equipment used, but the gamer dies when the time expires. Such an approach makes it possible to limit the surface areas accessible to a gamer, making the outdoor game more dynamic and tense. (A gamer can not wait in ambush for long, or look for something too thoroughly.)

**Anomalies**. In addition to the Upper World threats, many dangerous anomalies exist in the subway tunnels and catacombs. Some of them can cause just temporary deafness with parametric degradation and buzzing in the ears. Sectarians believe there is neither hell nor heaven after the war, and souls of the dead are wandering in the tunnels scaring the underground inhabitants. Even more strange places exist, where time and space shrink. Don't shoot at such places – bullet will just get stuck in the air. Nevertheless, living people move easily. We intend to use some gameplay variations at such places based on slo-mo.

## MINI-GAMES

In addition to the elements mentioned above, a kind of mini-games is to be used in the game, namely:

**«Move faster»**

This mini-game is aimed to make passing long tunnels less monotonous. The gamer hand-drives a rail car, while monsters and hostile NPCs try to chase him/her. The car is accelerated by pushing a control key repeatedly: the faster you push, the faster the car goes. Several options are possible in the situation. The gamer can sit face-forward and feel the danger by hearing the pursuers or seeing his partners' reactions. Otherwise, he/she can sit face-backward and see the hostiles.

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**«Light Target Designator»**

Is used in dark tunnels at the game beginning when the gamer has no equipment allowing to light and shoot simultaneously (rifle-attached light). Moving along a tunnel, the gamer lights aims for his/her partners. A partner shoots at a monster only if the gamer is holding it in his/her light beam. In another option, a partner is lighting aims for the gamer.

**«Rat Races»**

This is a logical arcade game widespread at certain stations. The gamer controls a rat that must pass the tunnel labyrinth to come in first to the finish. To take part in the game, a rat is to be purchased capable to compete with other racers.

**«No-Brake Train»**

This mini-game is based on the game physics and logic. The gamer can release brakes of trains locating in sloping tunnels having uncoupled previously unnecessary cars. Using such trains, it is possible to break hostile barricades or just pass long tunnels.

**«Missile Pointing»**

This is a final mini-game. The gamer selects a point on an electronic map to launch a missile. The salvo efficiency depends on how the gamer can read the map.

All stated above forms the following link:

## Shooter + Non-Linear Location Passing + RPG + Surviving = ADVENTURE

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# Non-linear Location Passing Example

The gamer's aim is to reach the underground Polis. At the very beginning of the mission he/she is with a group of diggers whose mission is to set trade relations with a neighbor station. The group consists of four men and a cargo rail car. In the first part of the group journey, the gamer goes on foot, shooting monsters attacking the caravan. In the second, high-speed part, he/she drives the car while others are shooting the attackers off. The car is accelerated by pushing a control key: the faster you push, the faster the car goes.

While moving, one of the partners replaces the gamer, so the latter can shoot the monsters.

Having arrived at the next station, the gamer discovers that the further path is blocked because of underground creature and anomaly excessive activity. He/she becomes acquainted with a character nicknamed Bourbon, who tells him/her about a group of merchants that are going to leave but have no convoy. Would not he/she agree to escort them to break through to the next station?

Thus, the gamer finds himself/herself in a tunnel with three merchants and Bourbon. The gamer's mission is to bring at least one merchant to the next station (the more merchants brought, the bigger is the payment). The tunnel they are going to pass through is completely dark, but the merchants have powerful floodlights to light targets. The gamer is going to shoot monsters lighted by the merchants with his/her partner doing the same. Some of the merchants become panicking or have their floodlights failed. The life is becoming tougher.

Having reached the next station, the gamer parts with the merchants going into tunnels controlled by the Ganza group. The gamer can't go there. He keeps going through abandoned tunnels people keep away of. Death lives there, so nobody can go there alone. Having discussed the matter with Bourbon, the gamer agrees to go in the tunnel with him. There is no light in the next tunnel too. As now there are just two of them, they light their way in turn. They will have to go through the Dead Zone anomaly where mystic whispers are heard, where everyone feels bad, where strange shadows move swaying ahead. A place of Horror…

Having reached an abandoned station, the gamer discovers that Bourbon is a gangster going to meet his gang. They can not settle some matters and continue their discussion with their guns. Bourbon dies, and the gamer remains alone against a whole gang. Soon he realizes that has no chance, but it occurs that Khan, one of the most interesting characters of the game, comes to his rescue.

Long underground life caused developing uncommon psi-capabilities in people. Khan is one of telepathists. He stops the fight and takes the gang remains under his control. The newly created group keeps going on...

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Breaking through tunnels to inhabited stations, the group finds itself in a psi-anomaly zone. . Perception is perverted there, space viscous, a wave of something strange rolling behind. The tunnels begin to crank at various angles, and gravitation is cranking too. The gangsters die in the anomalies, while the gamer becomes unconscious.

After recovering, the gamer finds him/herself at one of two adjacent stations inhabited by gangsters. Khan saved his life. The two stations are in a deep conflict which is about to become hot...

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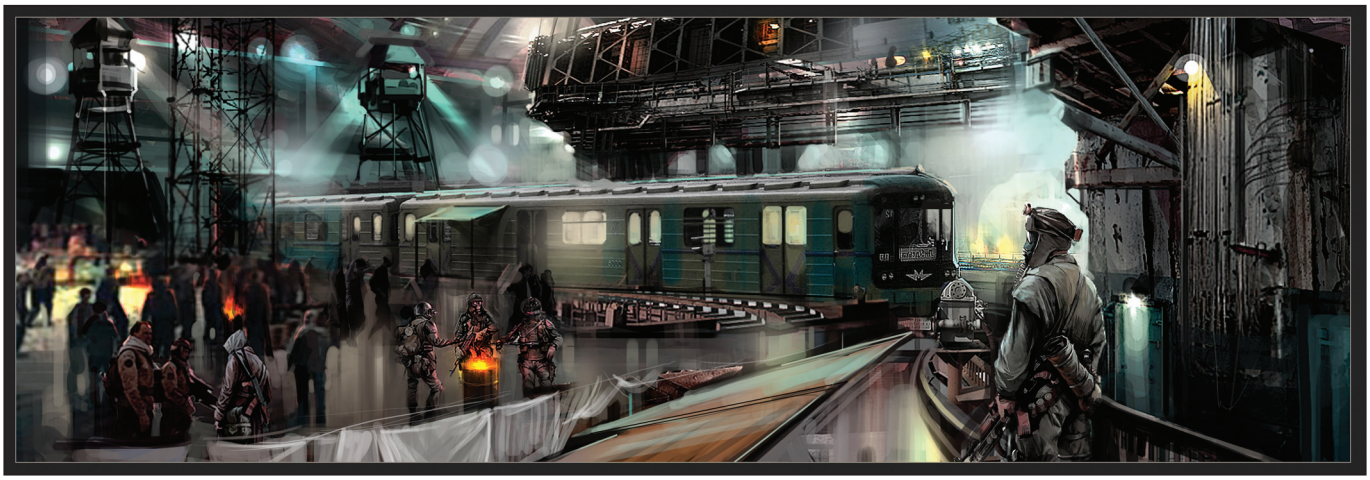
# Example Of Passing A Nodal Plot Point

To move further along the game plot, the gamer has to reach a station controlled by Ganza. The options offered:

The station-master of the border station the gamer is passing is a hot-tempered man keen on Rat Racing (a logical arcade game where the gamer controls a rat that must pass the tunnel labyrinth to come in



first to the finish). To take part in the game, a rat is to be purchased capable to compete with the station-master's rat. Having won, the gamer can get a passport.

To purchase a rat, the gamer need some cash or property for exchange (firewood, gasoline, weapons, medicines).

The nodal station is adjacent to two more stations. An Orthodox Christian sect occupies one of them. The sectarians search for Christian attributes (icons, books, crucifixes), and the gamer is charged with a mission to get to one of the Orthodox churches on the surface. After completing the mission, the gamer is to get half the sum required for purchasing a rat.

The second station is populated by free craftsmen suffering of endless attacks of surface creatures because of a destroyed barrier. The gamer uses the chance to help them. He/she fights off the next attack and restores the barrier. His/her award is a canister of gasoline which is just enough to purchase a rat.

Once back at the nodal station, the gamer can sell the gasoline and, adding a sum earned at Orthodox Christians, it will be enough to purchase a rat for races.

Otherwise, the money can be used to make the local scouts drunk to find out about a secret exit to the surface they use for sallies to replenish their stores. The gamer gets to the surface, finds a vehicle and, using the gasoline purchased from craftsmen, resumes his/her journey, now over the surface.

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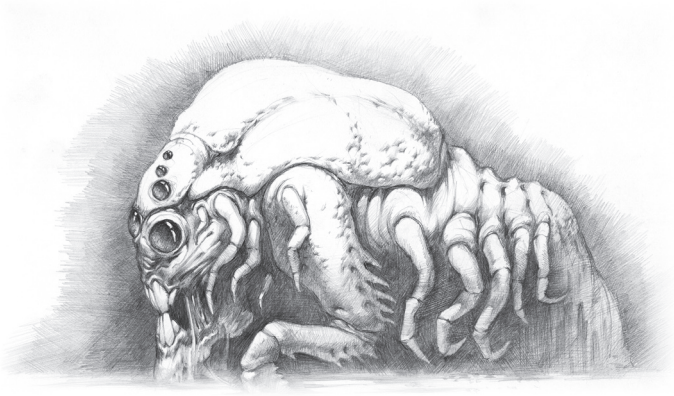
# Monsters

**Mutated rats -** "...most numerous "army" underground. Succeed by quantity Since their quantity is million times bigger than that of human beings, they turn the scale… If you have no flame thrower..."

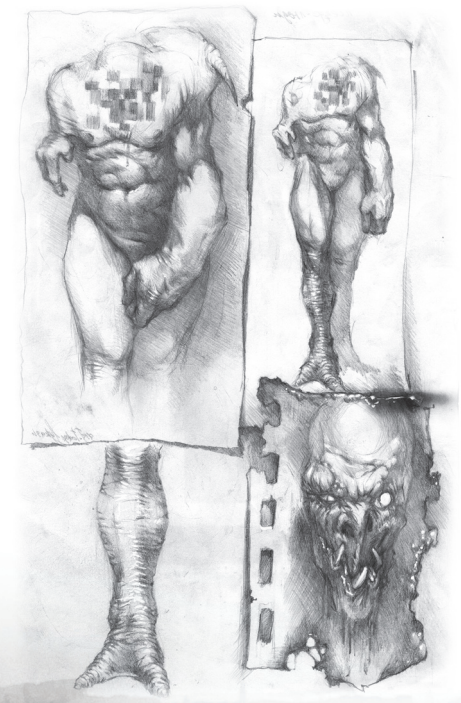


**Mutated insects -** "... Spiders outlasted dinosaurs. Is it now the time to outlast human beings? Because of the mutation, insects became much bigger and now they have all chances to compete with humans for living space…"

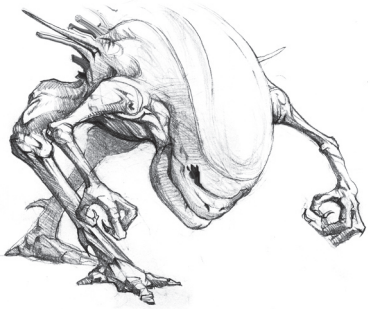
**Raider -** "...nobody knows where "it" came from, but its larva, laid in the body of its hypnotized victim often causes disasters at stations…"

**Underground dwarfs** - "...Mutated people living in tunnels under the subway. Their small frames and talent for camouflage permits them to get to a station passing patrols and to steal foods, water, and, to the horror of citizens, children! They are suspected to turn children, somehow, into dwarfs…"

**The Burnt** - "...one of the least dangerous mutants on the surface because of its extreme stupidity. Nevertheless, it is strongly recommended to stay away from his claws."



**Crier** - "...We can advice you to stay away from this creature, but the problem is that it decides by itself if it wants to meet you or not. If it meets you then be ready for "blindfold" fight and fast moving "trap". The cries of this mutant may cause short-time movement disorder, hearing and sight impairment..."



**Telekinetics** - "... Telekinetic abilities of these creatures are a result of their brain mutation ... few tons concrete block suddenly elevates by itself and falls on the gamer with the speed of a train...try to elude..."

**Chameleon** - "One of clever and unfriendly creatures...However, big claws make him less clever and more unfriendly...The only

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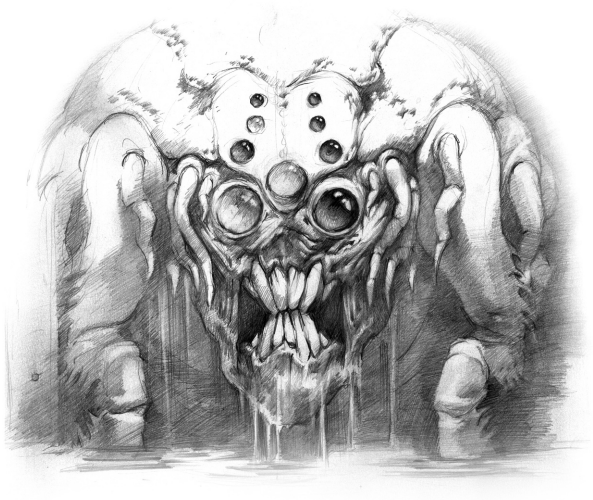

advantage is that beside human it eats telepathists and other mutants, and that is why all these creatures are afraid of it....Beside, it can fly (glide) from high buildings. It also can be invisible...It can be noticed by the typical distortion of air (as near the fire)..."

**Sight incendiarys** - "...Darwin would definitely go crazy if he saw the evolution cycle which occurred in 20 post-disaster years. However, many people believe that mutants came from some other dimension. They are so "different". And these mutated elephants are "live lasers". They accumulate solar energy and then discharge it in a blast of scalding irradiation. At nights they can shoot just for a very limited time, but meeting them in daytime, it is better to run away as fast as you can…"

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# Weapons And Outfit

The central character's arsenal is supposed to be classic for an action game, beginning from a knife and homemade cross-bows to heavy items like a flame thrower, a heavy machine-gun, or a hand-mortar.

Mainly, these will be small arms of the former Eastern Bloc a Western gamer is not familiar with, with some flavor of the Post-Nuclear World.

For personal protection, a gamer will have a wide choice of homemade means like steel cuirasses or chain armors as well as modern body armors, both soft Kevlar and heavy combat ones. There is also a wide range of helmets, from archaic ones to modern and perfect head and eye protectors. Also, a suit for chemical or radiation protection can be chosen.

The additional equipment list includes floodlights (both hand-held and rifle-attached ones), batteries for them, first-aid kits, scope sights (ordinary, collimator, night ones), rifle-attached bomb-throwers, gun sound-mufflers, Geiger counters, gas masks (air filtering and autonomous ones), walkie-talkies, various rucksacks, cartridge-pouches, waistcoats, and unloading systems.

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# Game Interface

It is supposed to use as few as possible of HUD elements or remove them altogether. Various menus and mini-maps are good for strategies but not for our game.

## Inventory

A gamer is mapped completely to a 3D character model which can be rotated or zoomed. The model reflects completely the gamer in action. Any changes made with the character can be seen in both the Inventory and cut scenes. The Inventory contains the active sector and rucksack.

### *Active Sector*

These are weapons and equipment that can be used immediately. The sector is shown to the right of the character model (pictures are required) and on the model itself. Thus, everything the character is equipped with – primary (a submachine gun) and secondary (a pistol) weapons, a knife, grenades, a first-aid kit, a noctovisor – is shown on the character model. The active sector size depends on the gamer's suit (body armor) coolness. If it is a last armor model for special commando troops, the gamer's active sector can include, in addition to primary and secondary weapons, 4 grenades, 3 knives, 2 first-aid kits, and a special Device (creeper). A light police body armor allows only 1 grenade and 1 first-aid kit.

### *Rucksack*

The rest equipment is to remain in the rucksack. This sector is shown to the left of the model. The gamer can access the rucksack only when there is no fight or other riot. Items are taken out of the rucksack to be placed in the active sector. The rucksack capacity depends on the outfit coolness.

## Health

Any health scale is absent. Wounds recover quickly. The gamer dies of intensive hitting. The gamer observes his/her state using various post-processes and camera effectors. On the whole, wounds are subdivided in three categories: light, moderate, and severe ones. Every wound category has its own rate of recovering. If the gamer is wounded, his speed, endurance, fire precision depend on the wound category. Using the first-aid kit requires some time and is reflected with animation.

## Cartridges

The gamer can opt the cartridge reserve to be shown. By default, the value is not shown. To prepare for a fight, the gamer attaches to his/her belt a required number of cartridge magazines. The allowed number of immediate items depends on the suit quality. Dressed in a special commando suit, the gamer has 7 slots for cartridges, and 5 slots for grenades and first-aid kits, while an ordinary tracksuit allows just 2 slots for cartridges and another two for grenades and first-aid kits. Thus, the gamer prepares himself/herself for the battle and knows exactly what ammunition he/she has. It is advisable to have every fifth

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cartridge in a magazine to be a tracer. The same stands for the last three ones. In such a way, it is easy enough to know at any moment your reserve ammunition.

## Mission Log and Terrain Orientation.

Mission recording and terrain orientation are supposed to be programmed in the form of an animated 3D push-button map-case appearing in the character's hands. It is supposed to include a subway map, note fields, and a compass pointing the active mission direction. The fields are filled with records as the game develops. To amuse oneself, an alternative method of finding directions by a cigarette lighter flame flickering can be used in the catacombs. The animated lighter model flame will always deflect in the active mission direction. The moment of lighting may be combined amusingly with a sudden monster attack.

## Trophies

Everything the gamer can see on the model of an enemy killed he/she can take with him after the fight is over. These include grenades, cartridge magazines, first-aid kits, body armors, etc. When selecting a dropped weapon, a take/unload mini-menu will appear.

## Communication Menu

A small dialog at the screen bottom. Answer with short-cuts.

## Trading Menu

When trading, the 3D Inventory model is replaced by the merchant's rucksack containing items that can be drag-and-dropped.

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# Transport

## Hand-Driven Rail Cars

Characters or the gamer drive such a car. The maximal car capacity is three persons.

## Gasoline Rail Cars

These are larger as compared with hand-driven ones, and can be equipped with a searchlight, small barricades, and heavy weapons (a heavy machine-gun). The maximal car capacity is four persons.

The gamer can not drive the car. He/she can use its fixed weapons (the machine-gun, the searchlight) or shoot with his/her own weapons.

## Vehicles

Vehicles are used in the game to cover large distances between subway stations over the surface. A vehicle can be driven by the gamer or an NPC.

The gamer and an NPC can shoot while moving. Vehicles can have various fixed equipment.

- Passenger cars – 1 to 4 seats.
- Trucks – 1 to 6 seats.
- Motorcycles – 1 seat.

## Subway trains

The gamer can release brakes of a train in a tunnel having uncoupled previously unnecessary cars.

## Moving Staircases

The gamer can run the moving staircases at some stations to ascend to the surface.

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# *Appendix 1*

«…Artem took a white-enamelled mug with what they called their station tea. Actually it was no tea but beverage made of dry mushrooms and additives, because there left next to nothing of real tea, so they used it sparingly drinking only on major holidays, because it cost dozens times as much as their mushroom tea. Nevertheless, they, at the station, like their slop and are proud of it and call it "tea" To tell the truth, strangers, at first, spitted it, but soon they got used to the mushroom tea. Then their mushrooms tea became popular outside their station, and traders came. Risking their arses, they came one by one first. But their tea was in great demand all over the line, and even Ganza became interested, and caravans arrived to the station to buy their wonderful tea. Thus money flowed to them, and money meant weapons and life. Since then, the station has become more powerful; new, hard-working people arrived from the neighboring stations, and the age of prosperity began.

Artem was twenty four, he was born on the surface and wasn't as scrawny and wan as anyone born underground and never daring to get to the surface fearing radiation and sizzling sun rays. Admittedly, Artem, being adult, was on the surface only once and for very short time; the radiation level was so high that those who were too much curious were scorched before they'd see the wonders of the surface world.

He did not remember his father. His mother lived with him till he was five. They lived on Timiriazevskaya station for a few years, and everything was OK, their life was quiet and even until that very day when Timiriazevskaya fell before the rat invasion.

Rats… huge, gray, wet rats poured suddenly from one of the dark side tunnels. The tunnel stretched deep into underground. Being a minor branch of the northern tunnel, it descended long way to the depths to get lost in the tangled mesh of hundreds of tunnels , in the labyrinth full of horror, freezing cold and disgusting stench. That tunnel descended to the rat kingdom, the place where no adventurer dared to go, and even a casual wanderer knowing nothing about underground dangers would have stopped before the runnel feeling by his instinct the black and terrifying danger springing from within, and then would have run away as quickly as possible, as one could run from a cursed town gate.

Nobody disturbed the rats. Nobody went down to their domain. Nobody dared to cross their borders.

But the rats dared.

A lot of people died that day when a live stream of huge rats never seen before flooded and washed away all barriers, burying both warriors and civilians alive under the grey mass suppressing howls of death. The rats gobbled everything on their way, both people, dead or alive, and their killed brethren – blindly, mercilessly kept on rushing further and further driven by some incomprehensible power.

Only few people survived, and they were not women, aged people, or children – no one of those whom people usually save first, but five strong men, who were able to outrun the deadly flow. They managed to do so for they were on patrol near the southern tunnel. One of them, having heard the cries from the station, rushed to find out what had happened. The station was perishing when he saw it at the end of the span. Seeing the rat "streamlets" penetrating to the platform, he realized what happened and was about to turn back knowing that there was nothing he could do when somebody pulled him by his arm. A woman with eyes full of horror was pulling his sleeve cried trying to outvoice the screams heard from everywhere:

- Save it, soldier! Let it live! Have pity for my child!

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Suddenly he saw that she was holding out a small child hand, a small plump palm,and he grasped this palm without thinking of saving somebody's life but just because he was called a soldier and asked for help. Dragging a child along and then just grasping him under his arm, the soldier rushed racing with first rats, racing with the death itself, forward, along the tunnel where his rail car and his friends were awaiting for him. He cried to them from far away to start the engine. Their car was motorized, the only motorized car for a dozen of neighbor stations, and this was just what made it possible for them to escape. They were rushing forward at full speed and passed the deserted Dmitrievskaya where several recluses had found a shelter. They hardly had time to cry "Run away! Rats!" understanding that those on the station would not escape. Approaching the cordons of Savelovskaya, they had, thankfully, a peace treaty with, they throttled back and cried to the patrol: "Rats! Rats coming!", and they were ready to keep on fleeing away, passing Savelovskaya and further along the line, begging the patrol to let them pass, further, till the end of the line, before the gray lava-stream flooded the subway.

Fortunately there was something in the Savelovskaya that saved them, Savelovskaya itself and possibly the whole Serpukhovskaya-Timiriazievskaya line. They were just approaching, all lined with sweat, shouting to the patrol about the death tagging behind, when that guys already uncovered some huge aggregation. It was a flame thrower assembled probably by local make-it-yourself enthusiasts. But it was a powerful weapon, probably more powerful than most of similar army units. As soon as first rats appeared and the space became filled with rustle and grinding of thousand rat clutches, the patrol activated their flame thrower and it kept operating until the fuel was over. Raging, orange flame filled the tunnel several dozen meters ahead, and it was burning rats steadily for ten, fifteen, twenty minutes, and the tunnel was filled with stench, disgusting stench of scorch flash and hair, and wild rats squeals … Behind the Savelovskaya defenders, who became heroes and famous all over the line, there was the car ready for a new chase, and there were five men on it, five survivals from the Timiriazevskaya station, and a child they saved. It was a boy, Artem.

Rats retreated. Their brainless will was subdued by one of the last inventions of human military ingenuity. People have always been better killers than any other creatures.

Rats rushed back to their enormous kingdom of unknown dimensions. All these labyrinths lying on extreme depths, were so strange and mysterious and seemed to be completely useless for the subway operation, for all known functions of it, so it was unbelievable, in spite of what authoritative people would tell, that they had been constructed by people, by ordinary metro builders.

One of those authoritative people was once an engine-driver's mate in an electric train. Such people were very rare, and they were well appreciated because for some time they were the only ones who did not lose self-control finding themselves outside of a comfortable, safe, and speedy train in dark tunnels of Moscow subway, in this megapolis bowel. Probably, it was because everybody on the station respected this engine-driver's mate and taught their children to do so that Artem remembered him for all his life. He remembered emaciated, exhausted person dressed in worn, faded subway worker uniform which had lost its style long ago, but he still wore it with pride like an admiral wearing his uniform, and it still struck mere mortals with awe. The weak frame of driver's mate seemed to irradiate ineffable power… Why not! Subway workers were like indigene guides for science expeditions in the primeval jungles. They were absolutely trusted and relied on because everybody's life depended on them. They often controlled stations when the system of unified government collapsed and the subway changed from a huge anti-nuclear shelter intended for salvation in a nuclear attack into a multitude of stations governed independently, into anarchy and chaos. The stations proclaimed their independence becoming strange little states with their own ideologies and regimes, leaders and armies. They fought against each other, unified within federations and confederations, became metropolises of empires only to be conquered by those who were once their allies or slaves. They entered into short-term alliances against a common enemy but only to bite one another even more violently when the threat is over. They quarreled for everything: for living space, for food – for farms of protein yeasts, for plantations of mushrooms which needed no sunlight for growing, for pig-breeding farms, where pale underground pigs were fed by colorless underground mushrooms, and surely

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for water, that is to say for filters. Barbarians not capable to repair broken filtering equipment in their stations and dying of water poisoned by radiation attacked, with savage fury, the stations where generators operated properly, filters were serviced regularly, where mushrooms grew and fat pigs grunted in their pens. Their instinct of self-preservation and eternal revolutionary principle, take away and share, pushed them to this endless desperate assault. Defenders of successful stations, divided into bodies of troops by former professional militaries, repulsed the barbarians' attacks to the last drop of their own blood, launched counter-offensives, fought for every meter of inter-station tunnels. Stations gained military power for punitive expeditions, for pushing their civilized neighbors out of their living space where no the agreement could be reached, and finally for repulsing attacks of all the vermin crawling through all holes and tunnels. Any of these strange, ugly and dangerous creatures might drive Darwin to despair by obvious lack of any compliance with evolution laws. Whether these creatures always lived in the deep underground, or they mutated under the destructive sunlight from harmless city animals into those devil incarnates, no matter how they differed from ordinary animals, they still were the continuation of life on the Earth. No matter how abnormal and unnatural, but still continuation. And they obey the same main instinct, which rules everything living on the Earth. Survive!

**Reproduce in order to survive,**

**Fight in order to survive,**

**And kill others in order to survive...»**

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# *Appendix 2*

## 4A-Engine

4A-Engine is a complete game development framework for next-generation consoles and DirectX9-equipped PC's, providing the vast array of core technologies, content creation tools, and support infrastructure.

## Rendering

- The gamma-correct, linear color space renderer
- High-Dynamic Range Rendering Using Floating-Point buffers, allowing for Tone Mapping, Exposure Adaption, and Blue Shift, for camera/eye perceptual rendering.
- Deferred Shading – allows hundreds of lights in frame, in huge, complex scenes
- Only Dynamic Lighting – and ability to use light-shaders, with dozens of special effects
- Weather and Day/Night model
- Global Illumination Effects
- Virtual Displacement Mapping
- Hierarchical Per-pixel Occlusion Culling.
- Realtime color correction
- Film grain and Noise
- Depth Of Field
- Motion Blur
- Analytical AA

## AI & gameplay

- Virtual vision, hearing, smelling – realistic, believable and time and memory efficient implementation enables characte rs to sense objects in a natural way, depending on the object velocity, luminocity, etc. - which is very useful for making stealth missions
- Goal selection using motivational graphs enables to setup character to select goals using his, sometimes orthogonal, motivations – make him survive and at the same time complete a story task given, for example.
- Action selection using Goal-Oriented Action Planning enables character to build dynamically an action sequence which reaches the goal selected. This makes it possible (using a handful of simple actions) to produce very intelligent behaviors. This technique produces intelligent behaviors even in situations which were not taken into account by the developer

## Productivity Environment & toolset

- Level Editing – fully integrated into the engine – you are always one click away from playing the game

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- Export tools for 3D Studio Max, Maya for bringing weighted meshes, skeletons, and animation sequences into the engine.
- Extensible particle system with visual editor, supporting particle physics and environmental effects.
- Physics modelling tool

## Sound

- Support for all major output formats of each platform, including 5.1 surround sound and certification-quality Dolby Digital.
- 3D sound positioning, spatialization, Doppler shift.
- Environmental effects, including EAX-4.0

## Streaming Technology

- Music
- CD/DVD
- Asset Streaming
- Use of Pack Files
- Sound

## Animation

- Sophisticated skeletal animation support
- blending of multiple animations with variable weights
- variable/multiple bone weight skinning

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# *Appendix 3*

## AI Design

1. Principles
    a. AI library provides several solutions for different AI tasks: navigation, decision making, group coordination, etc.
    b. Engine implements interfaces needed for AI library
    c. Both sides use LUA scripting language for connecting AI and engine parts
2. NPC
    a. Primitive
        i. Senses
            1. no senses
        ii. movement
            1. just plays some scenario animation with optional corresponding movement
        iii. features
            1. can aim at object in some specific states
            2. can make a shot
            3. can play sound
            4. can play particles
            5. doesn't have any intelligent behaviour
    b. Monster
        i. Senses
            1. has sound and visual perceptions
        ii. Movement
            1. build smooth paths
            2. coordinates in group for preventing collisions
        iii. Features
            1. can aim at object
            2. can make a shot
            3. can play sound
            4. can play particles
            5. can jump
            6. has close combat features
            7. has some kind of an intelligent behavior
                a. has group enemy selection
                b. do not use covers during combat

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c. Human
    i. The same as monster +
    ii. Movement
        1. can use ladders
        2. can jump up/down
        3. can use doors
    iii. Objects
        1. use various weapons
        2. can handle grenades
        3. can use stationary weapon
        4. can use vehicles (trolley)
            a. can drive vehicle
            b. can fire from the stationary weapon on the standing/moving vehicle
        5. can use buttons
        6. can pickup items
        7. can turn on/off torches
    iv. Can be in state "critically hit"
    v. When health level is low enough disables some of its abilities (run, being in crouch, move at all)
    vi. some kind of an intelligent behavior
        1. dynamic combat
            a. principles
                i. has group enemy selection
                ii. do use covers during combat
                    1. generated covers
                    2. prepared covers with unique behavior
                iii. use several tactics during combat
                    1. defense
                    2. attack
                iv. has enemy search
            b. react on grenades
            c. react on member death
            d. react on fresh corpses
            e. react on danger sounds
                i. enemy sound
                ii. attacked entity sound

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2. static combat with unique animations

3. Scene management
    a. Role system, where each entity has a role
    b. Role system is event driven in the way that event can be raised and event subscribers will be notified on this event. There should be several types of event generators: timer event generator, zone event generator (when actor entering particular zone) or any other custom one which we need through the game design process.
    c. Scene (Game) manager has its own role.
    d. Scene management should be organized hierarchically, it should be able to be decomposed into smaller types of the scenes for easy scene logic navigation
    e. Scene management should have preproduction mode for visual navigation through the data flow (events, timers, messages, callbacks, etc.)

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# *Appendix 4*

## TOPICAL GAMES, BOOKS, AND FILM REFERENCES

### *Games*

Listed below are solutions from other games implemented successfully (in my opinion) in this game after some refinement.

#### *Half Life 2*

- Realistic face animation.
- Interaction of an NPC with the environment.
- Using physics in the gameplay.

#### *Doom 3*

- Light and shadows as gameplay elements.
- Horror underground atmosphere.

#### *Elder Scroll 4: Oblivion.*

- Unique character visuals.
- A character 3D model to map the character status (equipment, wounds).
- Entrusting the gamer with additional missions.

#### *Metal Gear Solid*

- Produced cut scenes in the game engine.

#### *Splinter Cell*

- Interaction of a character with the environment (climbing up ropes and walls, using special equipments: hooks, noctovisors, etc.)

#### *Quake 4*

- Complex scripted scenes with many NPCs.

#### *King Kong*

- No HUD elements.

#### *Alien VS Predator*

- Some monsters moving over ceiling and walls.

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# *Appendix 5*

## Examples of Game Art

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